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ABSTRACT

The central premise of this paper is that there is a group of visual thinking skills which are becoming increasingly foundational and basic to the education of a contemporary citizenry. These skills are becoming more vital as the use of digital imagery increases. The skills are independent of the external technologies (i.e., hardware and software) that amplify their necessity; they are internal technologies of the human mind. (Contains 20 references.) (JLB)

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Visual Thinking for the Digital Age

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Visual Thinking Skills for the Digital Age

Dennis M. Dake

The central premise of this paper is that there is a group of visual thinking skills which are becoming increasingly foundational and basic to the education of a contemporary citizenry. These skills are becoming more vital as the use of digital imagery increases. The skills are, however, independent of the external technologies (hardware and software) that amplify their necessity; they are internal technologies of the human mind.

Moving from Analog (continuous) to Digital (discrete) imagery has many advantages for promoting sound visual thinking and graphic ideation. These advantages include:

- Empowering individuals with visual language skills
- Promoting interaction with visual imagery
- Increasing storage and retrieval of imagery
- Encouraging flexibility in visual thought
- Developing deeper meaning in visual messages
- Reusing existing visual imagery for communication.

Recent publications and lectures are full of praise for the technological marvels of the new digital technologies which will become increasingly available to the general populace. However, these strengths of the digital media may turn out to be an educational and cultural blessing or an equally great curse, depending upon how they are developed and utilized.

Technology does not always live up to its promise; just because a capability exists does not mean it will be effectively utilized. For example, when television was first introduced as a mass media, it was touted as revolutionary educational tool for mass education. That commercial television is now widely regarded as a "vast cultural wasteland" demonstrates how new media can fail to live up to their advertised potential. The fault lies not in the technology but rather in how we humans choose to use these new tools that modern technology provides.

Digital storage, manipulation and retrieval, with their pervasive speed do not create these problems but only accelerate and amplify the necessity for developing the necessary"internal technologies" of the human mind as basic education. Humans must not, as Henry David

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Thoreau once said, " become tools of their tools." Now is the time for humans to develop the thinking skills needed for control of the new digital tools.

These visual thinking skills, needed to understand and effectively use the full potential of digital imagery, are not technology specific. They can be taught with any media, since they reside in the human mind. The remainder of this paper will explore how each of the visual thinking skills, necessary to maximize the use of the digital media, can be learned with traditional art activities.

Puts Power of Visual Language in Individual's Hands

Powerful visual language tools will be much more accessible in future, and an educated public will need to have the skills to use them well. But literacy in language requires more than mere utterance. As the artist Paul Klee wrote in his journal, it is necessary in order to create effective form that one must concentrate on the lively process of formation. *"Form must on no account ever be considered as something to be got over with, as a result, as an end, but rather as genesis, growth, essence. Form as semblance is an evil and dangerous specter. What is good is form as movement, as action, as active form. What is bad is form as immobility, as an end, as something that has been tolerated and got rid of. What is good is form-giving. What is bad is form. Form is the end, death. Form-giving is movement, action. Form giving is life."* (Spiller, 1961)

Close examination of the visual record in art history shows clearly that visual ideas evolve, have precedents in the prior work of an artist, and slowly metamorphose into their final forms. This evolutionary change is conducted by disciplined visual thinking from visual configuration to visual configuration, over time. While the manipulability of the digital medium could be a great assistance in supporting this lengthy visual thinking, the educational focus must be on the process and not on the finished, developed form (digital image) at the end of the process.

As shown in the figures 1-5, from a college student of visual thinking, the process of generating original visual imagery is time consuming, hard work. This process does, however, build an honest and lasting sense of individual control over the ideation process rather than an illusion of control easily imparted by the quickness and slickness of digital manipulation. This digital illusion of control may lead image makers into the all too simple solutions when these are truly only initial starting points of the longer formation process.

The long evolutionary process of search and discovery for visual form can certainly be made more convenient and accessible when conducted in a digital environment. Because one can take fragments and elements of the visual world and recombine them at will, digital technology can also artificially heighten the sense of instantaneous illumination. But the danger is that the speed with which digital machinery responds will provide an illusion of success and control at the expense of the true disciplined work necessary for developing ideas. The best visual idea can not be known in advance by purely mental manipulation. It can only be discovered from a quantity of possible outcomes. What is convenient and accessible may not be true to perception and personality. Life takes time to

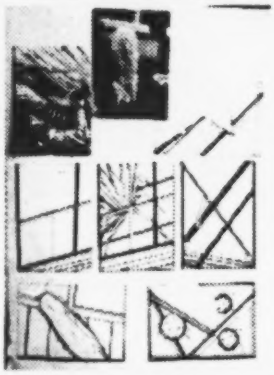

Figure 1: Visual configurations can be found anywhere.

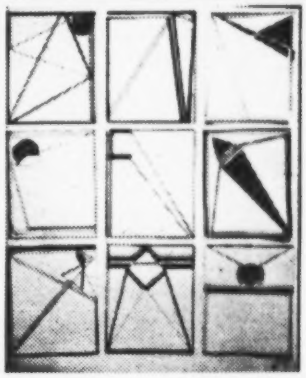

Figure 2: Thoughtful variations

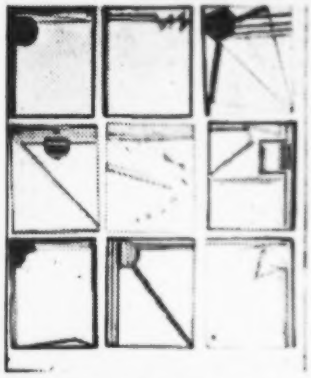

Figure 3: More variations

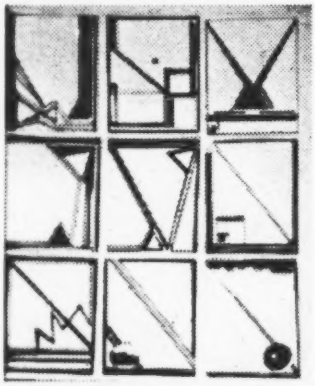

Figure 4: Visual ideas evolve over time.

Figure 5: Final Painting

Figures 1 - 5: Copyright Paula Schaffer Bolander, Used with permission of artist

unfold.

Greater Flexibility and Manipulability

As William J. Mitchell, author of the recent book, The Reconfigured Eye observed, *"Digital imagers give meaning and value to computational ready-mades by appropriation, transformation, reprocessing, and recombination; we have entered the age of electrobricollage."* (Mitchell, 1992). Because digital images are so manipulable, they challenge our traditional sense of visual reality. Digital images are stored as discrete bits of information which are context-free and available for either flexible manipulation, cloning, or combining images into new contextual relationships. This technologically assisted alteration is imperceptible to the unaided human eye. Electronic digital imaging has therefore made visual literacy more problematic.

The digital potential for image modification presents a great temptation to "improve" images, (i.e.. alter in ways not present in external reality). This same human motivation for producing images that captivate attention and compel effective communication has always been present for visual designers in older

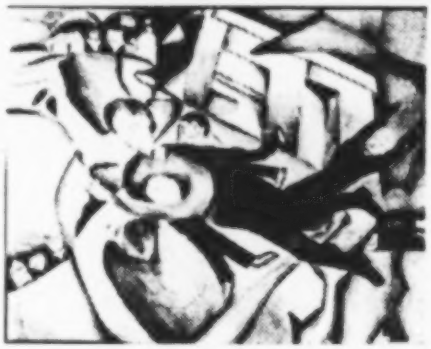

Figure 6: Beginning, illustration of the idea

Figure 7: Variation on the theme

Figure 8: Evolution into a verticle format

Figure 9a: Shaping into a statement in form

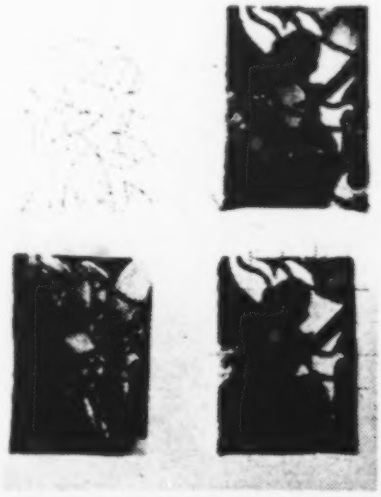

Figure 9b: Visual Logic develops

Figure 10: Final Painting

Figures 6 - 10: Copyright Deena Elm, Used with permission of artist

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media. Digital imagery just gives much more convincing and therefore potentially deceptive means for this image manipulation. The issues concerning the nature of visual truth and meaning involved in image manipulation are confronted every day by artists as an inherent part of their professional responsibilities. What do all the variations mean?

Figures 6 - 10, show the manipulation of an image on the theme of parental responsibility and child dependency. At first the image (figure 6) is representational and dream like. As the artist continued to refine the visual message, she changed it a great deal, thereby increasing its visual impact and meaning. The tensions, use of depth clues, and unity of the piece were increased in the act of thinking and rethinking its visual structure. The meaning was deepened by visually stressing in form only, an organic bonding of parent and child mixed in equal measure with the tied up feeling of overwhelming responsibilities. The final synthesis, shown in figure 10, is an eloquent form statement, still intuitively connected to the initial inspiration. Images can evolve into new forms which have greater cohesiveness, comprehensibility and congruity: a visual logic. Digital imagery and traditional art making are placed on the same footing in developing visual logic.

Since the photographic medium can no longer be trusted in a literal way, the credibility of the visual message designer becomes central. A developed sense of visual logic is a vital thinking skill for critically assessing the trustworthiness of these creators within the digitally mediated visual environment.

Increases the Interactive Dialog with the Image

With graphic ideation in any media, digital or otherwise, a difficulty arises in being both the observer and the active creator of the thing observed. In the digital age the artist or designer no longer has the advantage of an ego-driven, stable, and unchanging (objective) platform from which to make his/her design decisions. The objective position, in the western European visual tradition, is represented by static Renaissance perspective. With digital imagery, what one does visually is immediately changeable

Figure 11: Copyright Clint Hanson, Used with permission of artist

Figure 12: Finding a personal connection

Figure 13: Exploring Possibilities

Figure 14: Developing into a self portrait

Figure 15: Image comes together with metaphoric idea of exacto blade plunging "erotically" below the surface appearance.

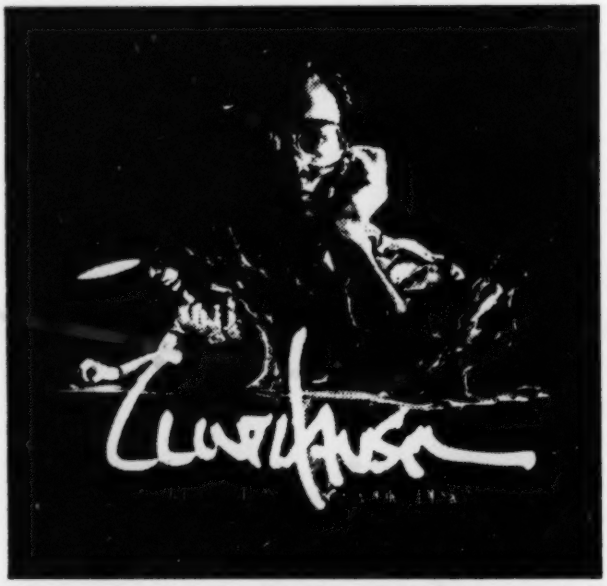

Figure 16: Final Scratchboard - frontpiece for illustrator's portfolio

Figures 12 - 16: Copyright Clint Hansen, Used with permission of artist

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and perceivable on the monitor. The self is totally immersed in this process and can not extract itself to some privileged static and stationary position from which to objectively view the message as it develops. As with the Heisenberg Uncertainty Principle in physics, the individual is an interlocking and inseparable part of the observed.

Even in the most ambiguous of visual environments, such as a crumpled sheet of white paper, shown in figure 11, personal meaning can be perceived. In this case the student of visual thinking has found a strange and mysterious face staring back at him while he develops the shapes on the crumpled sheet. This face can be seen turning into a meaningful self portrait in the subsequent visual thinking studies, shown in figures 12 -16.

What is perceived when working in a digital media can once again be instantly acted upon. This forces a multitude of decisions upon the designer, decisions made so quickly that he/she is denied the slow growth of vision and reflectivity afforded by older non-digital media. Quick decision making and reaction require a more fluid and open mental framework and the greater complexity of this interactive dialog requires a greater reliance on intuition as a thinking skill. Only by participating deeply in an interactive process and accepting it completely can the designer create new combinations of existing ideas with a deeper series of meanings.

How much meaningful experience will future students get interacting with the new digital media (as opposed to simply being passive consumers) when our school systems do not yet place a high priority on developing intuition? Quality visual education will be needed to develop the intuitive thinking skills necessary to handle this aspect of the new digital environment. Every individual must be intimately involved.

Storage and Retrieval Greatly Expanded

Digital storage and retrieval of information is instantaneous. Unlimited exact copies of information can be quickly made in any number and reliably stored. Access to past images can be quick and sure. But this storehouse of information is accessible only if the individual can remember that the images exist and know where to find them. Greater storage and retrieval are of great advantage to the visual image maker because they give greater access to past ideas and therefore to potential new directions for thought. If the visual message designer can access and have use of much more material, new thoughts will be richer.

The problem is that not all that can be saved as visual data is worthwhile. More visual ideas are available for use from digital image data banks than are necessary for the process of visual thinking. This brings up an issue of human meaning and utility. Even if we believe we see what might be useful as an image, it is by no means certain that we will have the necessary thinking skills to use it effectively. Perhaps, the older, more time consuming artistic practices of recopying and redoing images, by hand, serve an important human function. Visual thinking by drawing allows for the time and reflection necessary to discover the deepest, meaningful associations possible with the material.

Traditional image generation places a

premium on using original sources provided by a heightened visual memory. For example, figures 17 - 19 are sketches leading to the development of a large, expressive ceramic container (Figure 20). The finished container was based upon the discovery of important personal memories of a youthful fascination with horses and psychological associations with a long forgotten horse blanket. Multiple thinking sketches helped the artist to understand and visually synthesize this meaning in an intuited form. This process is time consuming and emotionally difficult work. It is, however, absolutely necessary if the final form is to convey a strong sense of personal conviction.

In many ways the seductive traits of digital imagery, without disciplined visual thought, can lead the person away from

Figure 17: Horse as idea source

Figure 18: Possibilities

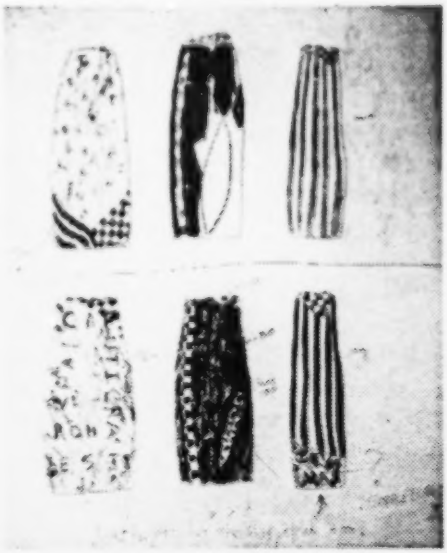

Figure 19: Disciplined search for form that fits the individual's experience

Figure 20: Ceramic container

Figures 17 - 20: Copyright Karen Terpstra, Used with permissionof the artist

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meaningful imagery. Psychologist Rudolf Arnheim pointed out this danger in reference to media based curriculums of an earlier era. *"By now, we start in kindergarten to overwhelm children with an endless variety of materials and tricks, which keep them distracted - distracted from the only task that counts, namely, the slow and patient and disciplined search for the one and only form that fits the underlying experience."* (Arnheim, 1972, p13)

The tricks of digital imagery must not be allowed to distract the next generation of students from the all important task of form refinement. Educationally it does not matter if the form turns out to be a work of art, science, or technology.

Multilevel Meaning rather than Linear, Singular Meaning

The ability to generate multiple versions of visual forms and then refine them for a sense of visual logic leads to another problematic area: the nature of visual meaning and truth itself. When a digitally altered (that is to say undetectable, modified, photographic-like image) enters the external world of visual communications it still conveys a convincing sense of real context to the viewer. When viewed against the conventional societal standard of singular meaning (which holds that this image must either be a true representation of the world as it exists or else it is false, misleading, or worse) the digital image poses new problems of interpretation. This new and confusing state of affairs leads a sensitive viewer to questions such as, "Is this visual evidence I can depend upon or is it sly propaganda and manipulation?" A loose standard of truth, such as that favored by the supermarket tabloids, is not sufficient for any critically thinking, visually literate person.

The long held western European cultural illusion of a single, visually knowable, objective truth is in for some serious revision. In a digitally controlled "virtual reality," each manipulation and modification of visual form leads to alternative implications and interpretations. Where do ultimate meaning and truth reside?

The reality seems to be that truth and meaning reside equally in the minds of both the person making and the person viewing the form. Visual reality, in the digital age, is clearly revealed as an individual's own construction, based on past experiences, expectations and assumptions. The ability to digitally alter visual imagery, at will, is leading to a blurring of the boundaries between metaphoric art with its multiple interpretations, supposedly objective science, and everyday life itself. Like works of art, digital images are endlessly self-referential symbolic constructions.

The visual arts have always been considered subjective; that is to say, individual and unreliable as a source of literally accurate information. Visual reality is revealed in a digital environment to be a much more malleable construct than a visually illiterate public seems yet to realize.

The art student who produced the image (figure 24), of an astronaut floating on an unusual tether had to deal with this slippery nature of visual reality. Her first visual thinking efforts (figure 21) were directed at the discovery of personal meaning only. In a series of drawings of floating ribbon-like structures in which appeared a human face, she found a compelling theme of unknown meaning.

Figure 21: Early "ribbon" drawings

Figure 23: Astronaut on tether

Figure 22: Possibilities

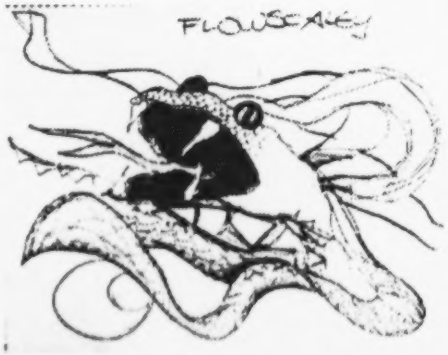

Figure 24: Vision from a dream

Figure 25: Final scratchboard drawing

Figures 21 - 25: Copyright Carol Roan Hafkemeyer, Used with permission of artist

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This was followed, some time later, with an interest in drawing from a photograph of an astronaut on a spacewalk, tethered by support lines to his space ship. In her thinking, these two frames of experience (astronaut and ribbons) were separate for a long time. Then one evening a particularly vivid dream of a "flow-scaly" snake (figure 23) provided her with a visual suggestion of the necessary synthesis of form and meaning. This creative insight became the basis for her final scratch board drawing (shown in figure 24).

This discovery of meaning and associated form could not be made by purely conscious verbal reasoning alone. It required sustained visual thought and reflection. In this act of visual creation and discovery, multiple levels of meaning have also been discovered. On the literal level, the image is still recognizable as an astronaut tied by umbilical cord and oxygen hose to his mother ship. On a personal level the artist revealed that she was herself, as a college student, still tied by a psychological umbilical cord and finances to her mother. The truth of the complete dependence of every fetus on its mother through an umbilical cord is also implied in this image. On a psychological level, every individual remains tethered to the experiences and ideas of their individual past. A healthy maturation requires a recognition of this reality. Finally, it might be noted, theories concerning the evolution of the human species suggest an aquatic, reptilian origin for the oldest evolutionary portions of the brain. In the triune brain, the brain stem serves as a tether to the body. All of these multiple levels of meaning have to be simultaneously explored and molded by the visual designer into one visual creation.

Digital imagery requires of its viewers and creators alike the ability to accept and attempt to understand multiple, simultaneous levels of meaning as a basic educational reality. Digital technology has put "the process of shifting confusions of art and artifice, reality and illusion, into our own hands." (Brand, et. al., 1985). We need an alternative paradigm in our culture for understanding that meaning and truth are dependent upon the conceptual and perceptual framework of each viewer.

Use and Reuse of Existing Images from the Global Village

Because digital images are so easy to store and retrieve, vast image data banks are being created with imagery from throughout the world. This multiculturally rich body of work can be used in an unlimited variety of ways. This becomes a problem when an important image from one cultural context is misapplied to other ends. Intention and appropriate usage are issues that raise strong emotional reactions in the people who create and hold images as central to their culture. We may, as Marshall McLuhan observed, "now live in a global village...a simultaneous happening." (McLuhan, 1967), but all is not well in that village when an important image is misappropriated. Ethical problems can also arise from the reuse of existing images in one's own culture when that image is under copyright. Digital imagery, by breaking the evidentiary bonds with the original source, makes misappropriation and misuse of important images ever more likely.

All traditional artists have had to deal with the existence of precedent images as an integral part of their work. Art history provides only a limited range of themes,

Figure 26: Last memories

Figure 27: "Aging" nature

Figure 28: Multicultural sources

Figure 29: Personal images

Figure 30: Visual ideas come together

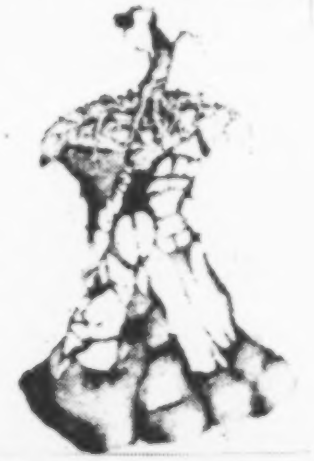

Figure 31: Final Drawing

Figures 26 - 31: Copyright Michael Lyons, Used with permission of artist

styles, and sources. Where is the artist to draw the thin line between appropriate eclectic usage and dishonest copying of prior images? This ethical issue requires a crucial ethical, decision making process. In an age of ever-shifting visual relationships, there is a deep educational need for learning how to handle a post modern contextual dialog.

Figures 26 through 31 illustrate an art student's visual quest for an image to evoke the memory of his deceased grandmother. Visual reminders of this grandmother's reclusive environment (figure 26) mix freely with images from nature (figure 27). Larger contextual issues are indicated by multicultural images (figure 28) and forms (such as an apple core) from the artist's environment (figure 29). These he has blended into a unique and original symbol (figure 31). Is the originality (honest expression of one's origins) as shown in this example, a dependable source of meaning for the viewer? To answer this question our education system needs to promote divergent as well as convergent thinking.

Conclusion

The sheer volume and speed of digital imagery threatens to overwhelm the thinking ability of humans. There are vital visual literacy education issues which need to be addressed, such as: accurate vision, imaginative vision, truthful vision, metaphoric vision, and logical vision. William Mitchell in his book, "The Reconfigured Eye" summarized these implications of digital imagery in the following manner. *"The growing circulation of the new graphic currency that digital imaging technology mints is relentlessly destabilizing the old photographic orthodoxy, denaturing the established rules of graphic communication, and disrupting the familiar practices of image production and exchange. This condition demands, with increasing urgency, a fundamental critical reappraisal of the issues to which we put graphic artifacts, the values we therefore assign to them, and the ethical principles that guide our transactions with them."* (Mitchell, 1992, p 223) We are a long way from developing, understanding, and implementing an educational agenda for the digital age.

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